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Title: DDSTE Lab Overview March 2021

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Los Alamos
NATIONAL LABORATORY

Welcome to Los Alamos National Laboratory
Overview

March 2021

NNSA National Nuclear Security Administration
Managed by Triad National Security, LLC., for the U.S. Department of Energy's NNSA

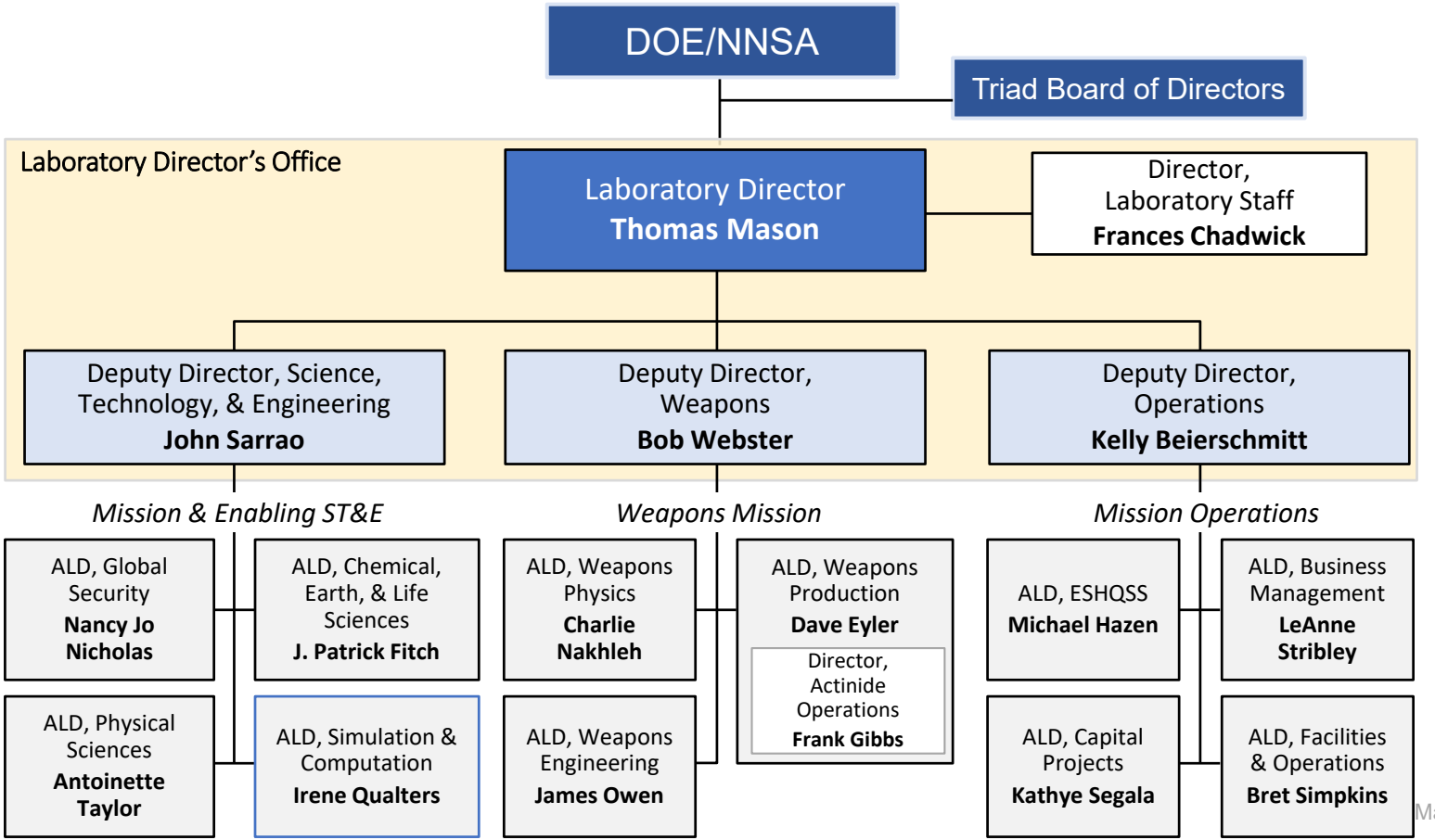
Our national security mission is broad and important

- **Ensure the safety, reliability, and performance of the U.S nuclear stockpile**
  - Serve as design agency for 4 of 7 nation's deployed nuclear weapons systems
  - Fulfill production agency roles
- **Anticipate, reduce, and response to emerging national security threats**
- **Deliver scientific discovery and technical breakthroughs**

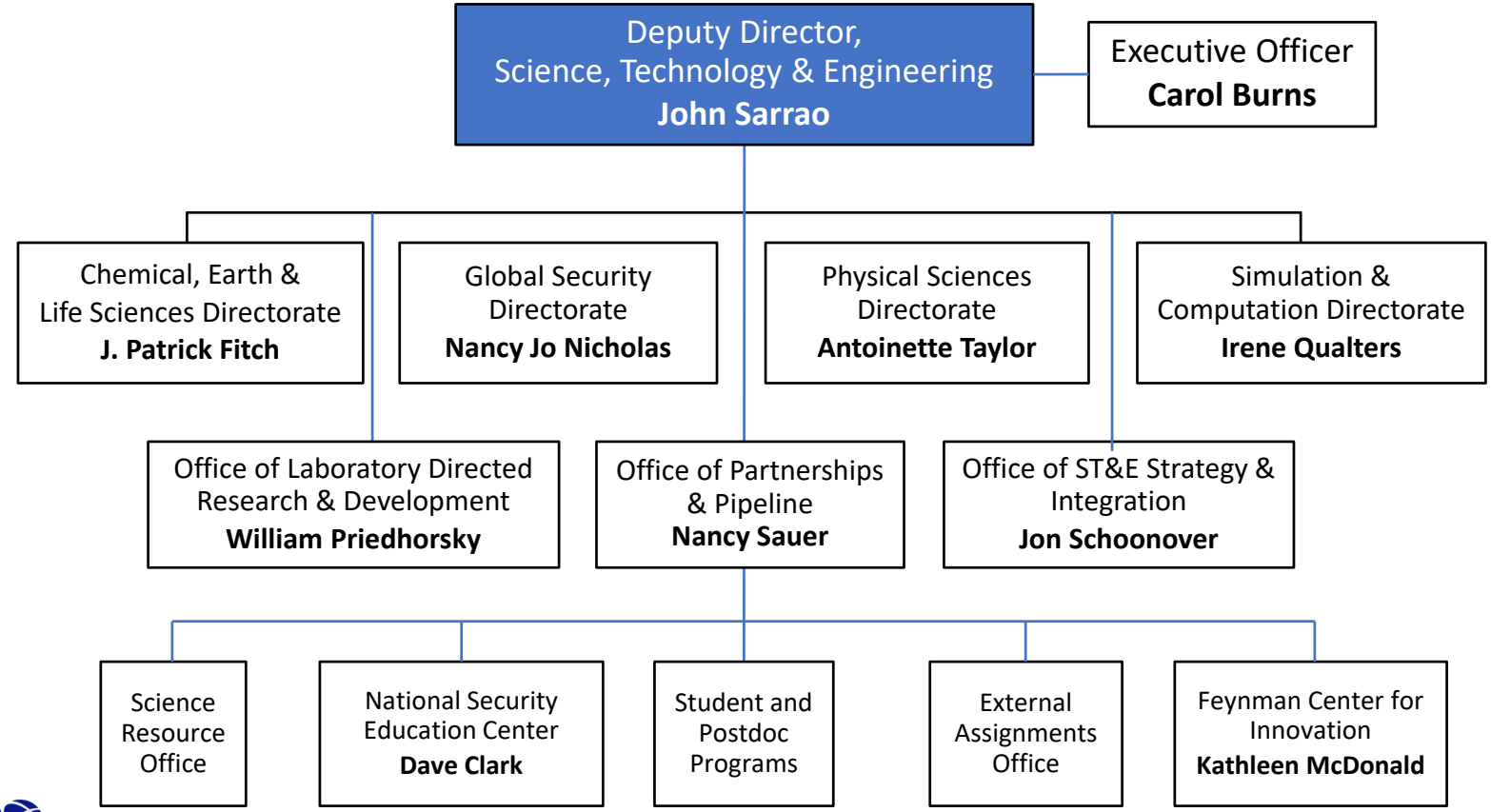
LANL STATISTICS

40 square miles	1,280 bldgs., 9M sq ft
47 technical areas	11 nuclear facilities
13,000 workers on site	8,900 career employees
1,144 students	498 postdocs
Average employee age: 43	65% male; 35% female 45% minorities

LANL Organization structure



The DDSTE organization facilitates capability stewardship



Simultaneous excellence:
Balance between operations and mission

Design, produce, and certify current and future nuclear weapons and reduce global nuclear threats

Deliver scientific discovery and technical breakthroughs that support DOE & NNSA missions

Execute sustained operations that are reliable and responsive to mission needs

Sustain and enhance LANL's partnership with the community across Northern New Mexico

***How* we do our work is as important as *what* we do**

Our capability pillars define six key areas of science, technology, and engineering in which we must lead

Materials for the Future	Defects and Interfaces Extreme Environments Emergent Phenomena
Nuclear and Particle Futures	Applied Nuclear Science & Engineering Nuclear & Particle Physics, Astrophysics & Cosmology Accelerator Science & Technology High Energy Density Physics & Fluid Dynamics
Integrating Information, Science, and Technology for Prediction	Computing Platforms Computational Methods Data Science
Science of Signatures	Nuclear Detonation Nuclear Processing, Movement, Weaponization Natural and Anthropogenic Phenomena
Complex Natural and Engineered Systems	Human–Natural System Interactions: Nuclear Engineered Systems Human–Natural System Interactions: Non-Nuclear
Weapons Systems	Design Manufacturing Analysis

FY21 Lab Agenda

SIMULTANEOUS EXCELLENCE	1.0 NUCLEAR SECURITY	2.0 MISSION-FOCUSED SCIENCE, TECHNOLOGY & ENGINEERING	3.0 MISSION OPERATIONS	4.0 COMMUNITY RELATIONS
Strategic Objective (10–20 years)	Excellence in Nuclear Security	Excellence in Mission-Focused Science, Technology & Engineering	Excellence in Mission Operations	Excellence in Community Relations
Critical Outcomes (5–10 years)	Design, produce, and certify current and future nuclear weapons and reduce global nuclear threats	Deliver scientific discovery and technical breakthroughs that support DOE and NNSA missions	Execute sustained operations that are reliable and responsive to mission needs	Sustain and enhance LANL's partnership with the community across the Northern New Mexico region
Major Strategic Initiatives (1–5 years)	1.1 Execute LANL's Manufacturing mission to deliver 30 plutonium pits per year 1.2 Transform nuclear weapons warhead design and production 1.3 Anticipate threats to global security; develop and deploy revolutionary tools to detect, deter, and respond 1.4 Support modernization of LANL warhead systems 1.5. Assess the stockpile as it ages and project weapon systems lifetimes	2.1 Refresh and refine the LANL capability pillar framework 2.2 Advance accelerator science, engineering, and technology to enable future stewardship capabilities 2.3 Advance the frontiers of computing to exascale and beyond 2.4 Assert leadership in the national quantum initiative 2.5 Develop and implement an integrated nuclear energy and nuclear materials initiative 2.6 Implement an integrated initiative for plutonium and actinide missions based on FY20 strategy 2.7 Implement a national security life sciences initiative	3.1 Change organizational culture with an emphasis on organizational learning 3.2 Improve integrated planning across priority mission activities and infrastructure 3.3 Address critical issues related to NMCA, nuclear safety, criticality safety, waste, and classified enhancements 3.4 Implement systematic process improvement to drive increased rigor and efficiency in work execution 3.5 Enhance quality of work life, workforce planning, and training and development	4.1 Continue commitment to the community with educational, economic, and philanthropic investments of time and resources 4.2 Strengthen pipelines and partnerships to build workforce of the future 4.3 Enhance small business participation in executing LANL scope across all directorates 4.4 Demonstrate agility and flexibility in our partnerships, effectively balancing benefit and risks

The strength of our capabilities allows us to engage in multi-institutional consortia

National Risk Assessment Partnership (NRAP)

NRAP
National Risk Assessment Partnership

Carbon Capture Simulation for Industry Impact (CCSI²)

CCSI²
Carbon Capture Simulation for Industry Impact

Producing Algae for Coproducts and Energy (PACE)

PACE
PRODUCING ALGAE FOR COPRODUCTS AND ENERGY

Algal Biomass Yield (ABY) @ Kona Demonstration Facility (KDF)

Fuel Cell Performance and Durability (FC-PAD)

FCPAD
FUEL CELL PERFORMANCE AND DURABILITY

Grid Modernization Laboratory Consortium (GMLC)

GRID
MODERNIZATION INITIATIVE
U.S. Department of Energy

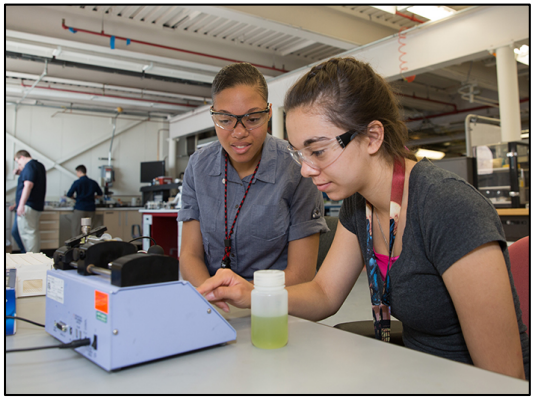
Partnerships & Pipeline Office (PPO) was formed to enhance our internal coordination and external outreach

Pipeline

Partnerships

Pipeline Mechanisms:

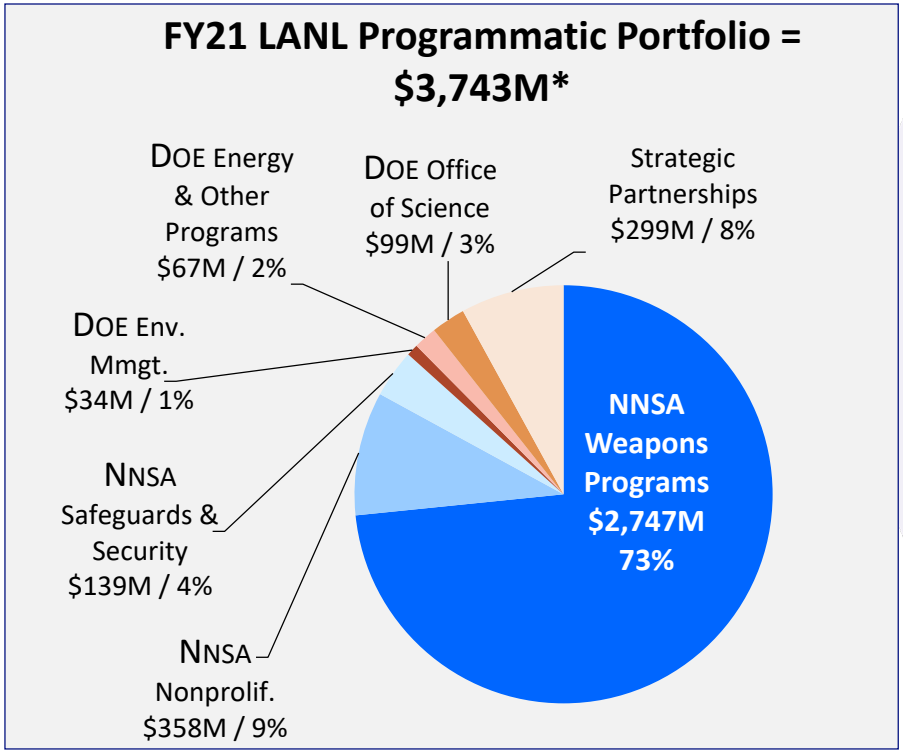
- **Student Programs:** Education opportunities for high school, undergraduate, and graduate students
- **Postdoctoral Programs:** Postdocs contribute to research efforts, enhance our STE capabilities



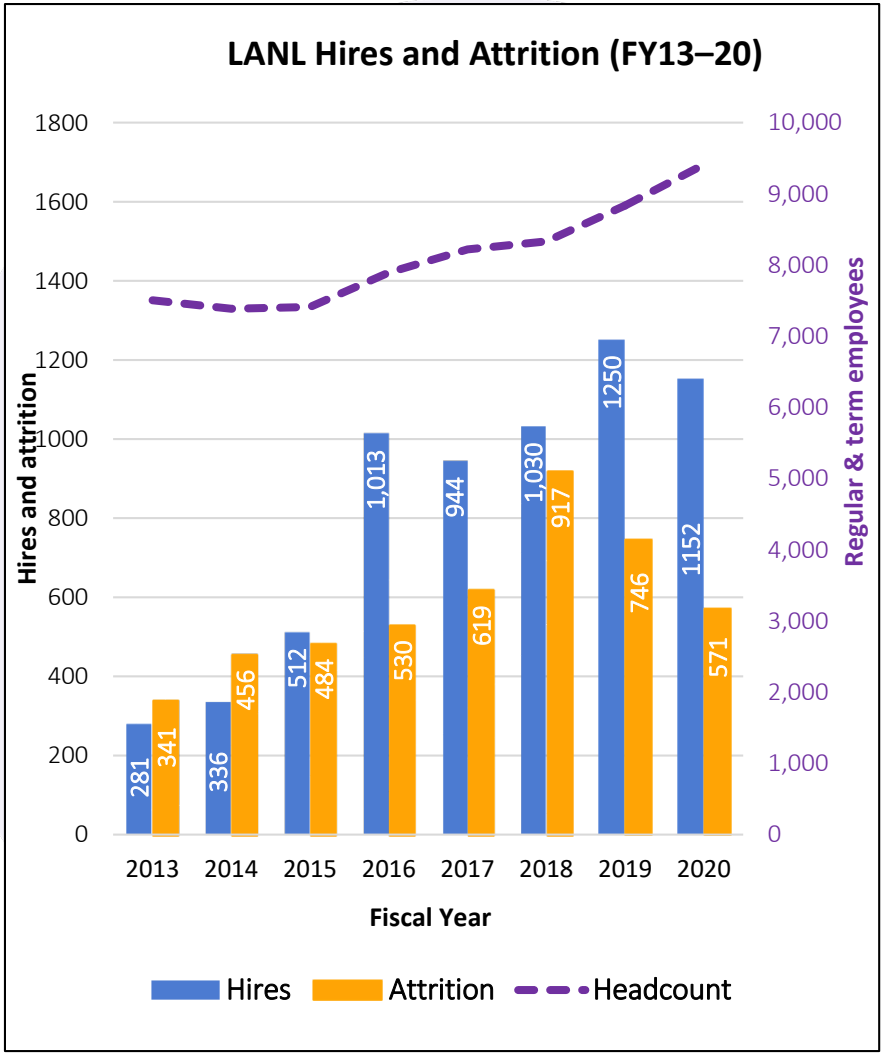
Partnership Opportunities:

- **National Security Education Center Strategic Centers:** Scientific centers of excellence with high international visibility that innovate strategic new science and education programs
- **New Mexico Consortium Coordination:** Creative mechanisms for collaboration with NM research universities through joint appointments and unique facilities
- **Feynman Center for Innovation:** From “tech transfer”’ to innovation asset stewardship with strategy driven through Innovation Asset Strategic Council

Budget, employee numbers continue to grow



** $550M more than FY20*

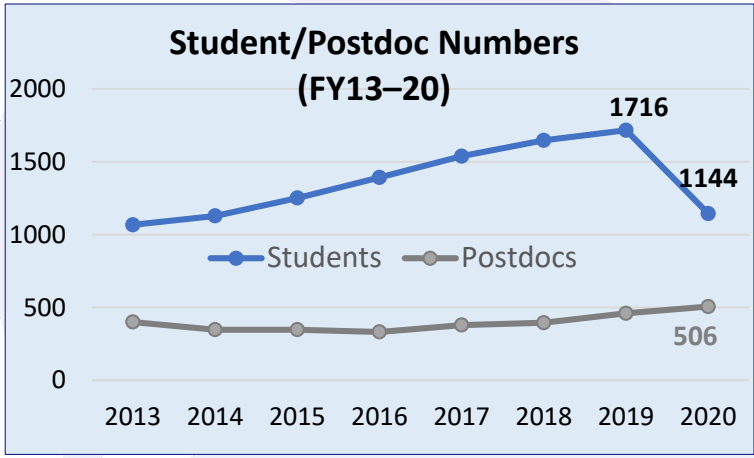


We have a new administration in Washington, D.C.

- **Much has changed in D.C. over the last few months**
  - Granholm confirmed as Secretary of Energy
  - We have a new acting NNSA Administrator
- **The Laboratory's priorities & mission will endure**
- **We see new opportunities in climate research, nonproliferation, renewable energy, and bioscience**

Pipeline and diversity initiatives essential to our success

- Student, postdoc programs and initiatives help boost diversity in student pipeline
  - Hybrid student program planned for 2021
  - Summer Schools are a unique pipeline with targeted recruiting: nine summer schools planned for 2021
  - More opportunity to increase diversity in postdoc program, a key staff pipeline
- 75% of new hires in past year are from New Mexico



Postdoc Diversity*	LANL	DOE Nat'l Labs
Women	24.9%	25.5%
Under-represented minorities (URM)	6.8%	6.9%
Other people of color (OPC)	36.8%	43.8%

**2020 (URM: Hispanic, Black, Native American; OPC: Asian)*

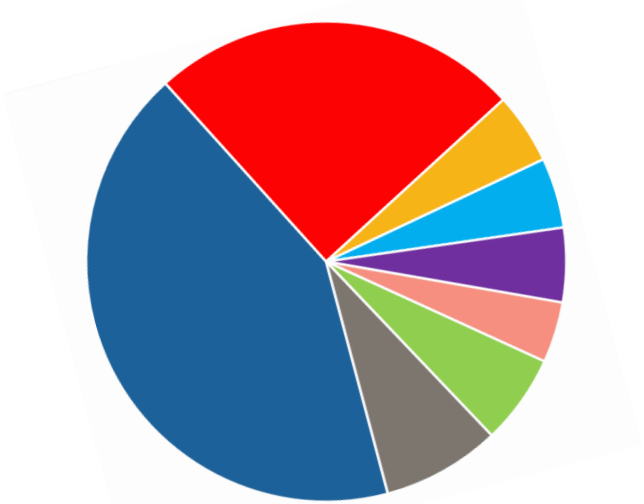
LDRD, invested through the pillars, is an important mechanism to ensure capability health

Baseline LDRD Program
FY21 Budget: $165M*

Exploratory Research
25%
Strengthen capabilities via discipline focus

Directed Research
42%
Explore mission solutions via interdisciplinary teams

Reserve (*As of 7/20)
(unencumbered)
8%



Early Career Research
5%
Develop next-generation technical leadership

Postdoctoral R&D
5%
Support top-quality talent

Mission Foundations
5%
Translate discovery into innovative solutions

Centers
4%
Advance rapid-turnaround ideas

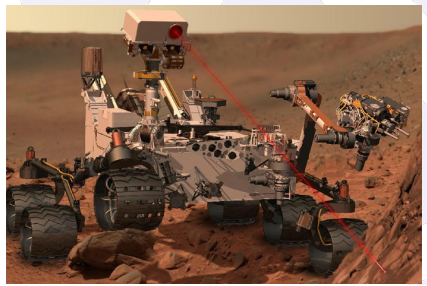
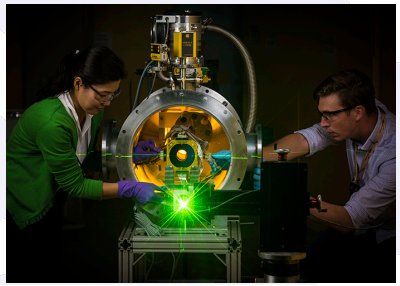
Director's Initiative
6%
Bolster growth areas determined by Lab leadership

We invest LDRD to foster mission agility, technical vitality, and workforce development

Los Alamos delivers national security mission solutions

- By applying multidisciplinary science, technology & engineering capabilities, in unique experimental, computational, and nuclear facilities
  - With an agile, responsive, and innovative workforce
    - Dedicated to addressing complex national security issues and the world's most difficult challenges
      - And partnering with like-minded colleagues for mission success



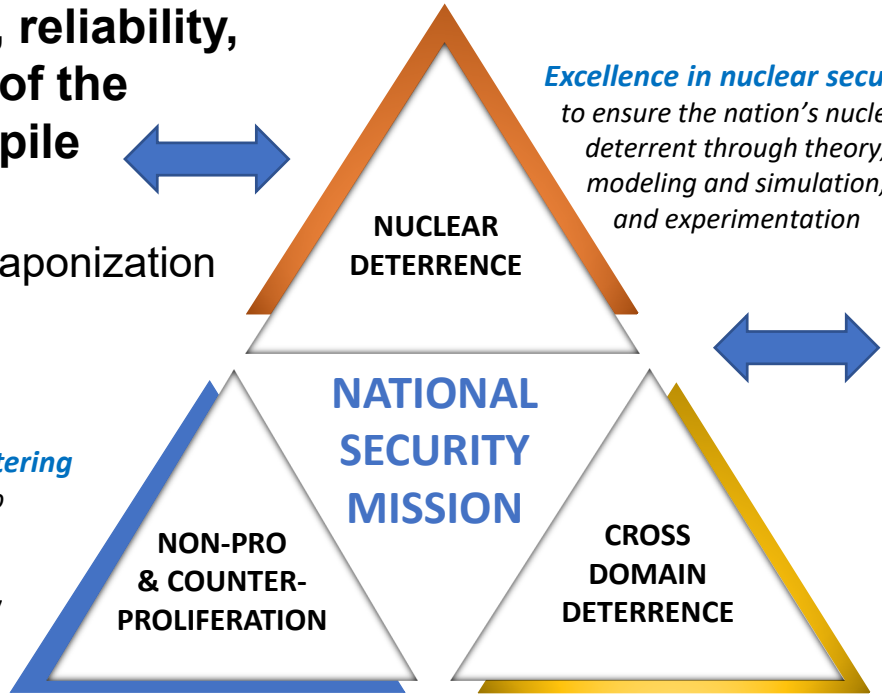



Slide Options

Our national security mission is broad and important
— and motivates and is enabled by ST&E discovery

Ensure the safety, reliability, and performance of the U.S nuclear stockpile

- Physics & Design
- Engineering & Weaponization
- Production



Excellence in nuclear security *to ensure the nation's nuclear deterrent through theory, modeling and simulation, and experimentation*

Preventing and countering *efforts of proliferants to acquire, develop or disseminate materials and expertise necessary for nuclear weapons*

Energy security

- Sustainable Nuclear Energy
- Resilient Materials
- Complexity in Energy Systems

Supporting *the DoD, IC, and other national security partners to execute multidomain operations across land, air, sea, space, and cyber*

Laboratory Agenda ensures simultaneous excellence

Excellence in Nuclear Security

Design, produce, and certify current and future nuclear weapons, and reduce global nuclear threats

Champion
Bob Webster

Excellence in Mission-Focused ST&E

Deliver scientific discovery and technical breakthroughs that support DOE and NNSA missions

Champion
John Sarrao

Excellence in Mission Operations

Execute sustained operations that are reliable and responsive to mission needs

Champion
Kelly Beierschmitt

Excellence in Community Relations

Sustain and enhance LANL's partnership with the community across the Northern New Mexico region

Champion
Frances Chadwick